

Cummins Technical Operations



ENGINE MODEL : 6BTA5.9-C180
CURVE & DATASHEET : FR91536

REV 00 15JUL2006



Engine Performance Curve

Basic Engine Model:
6BTA5.9-C180

Curve Number:
FR91536

Pg. No.

Engine Family:
D40

CPL Code:
8541

Date:
2006-7

01

Displacement: **5.9 L**

Aspiration:

Turbocharged & JWAC

Bore: **102 mm**

kW (BHP)

@ RPM

Stroke: **120 mm**

No. of Cylinders:

6

132 (180)

2200

Emission Control: **EPA Tier1**

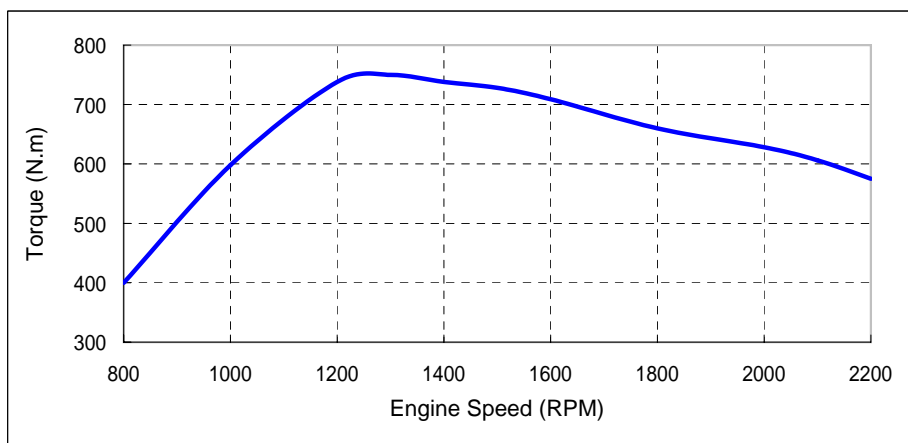
Fuel system:

Inline-WEIFU PW/RSV

8% Governor Regulation

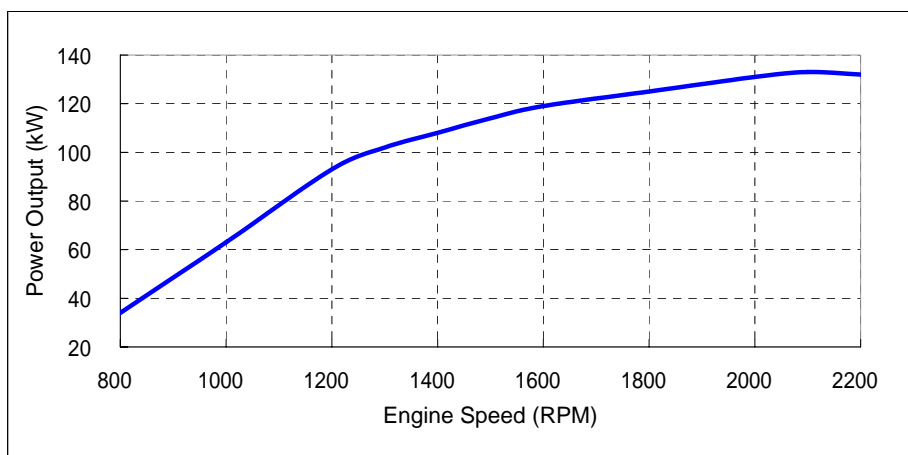
All data are based on the engine operating with fuel system, water pump, lubricating oil pump, and 250 mm H₂O (10 in. H₂O) inlet air restriction and with 50 mm Hg (2.0 in. Hg) exhaust restriction; not included are alternator, fan, optional equipment and driven components.

Performance curve



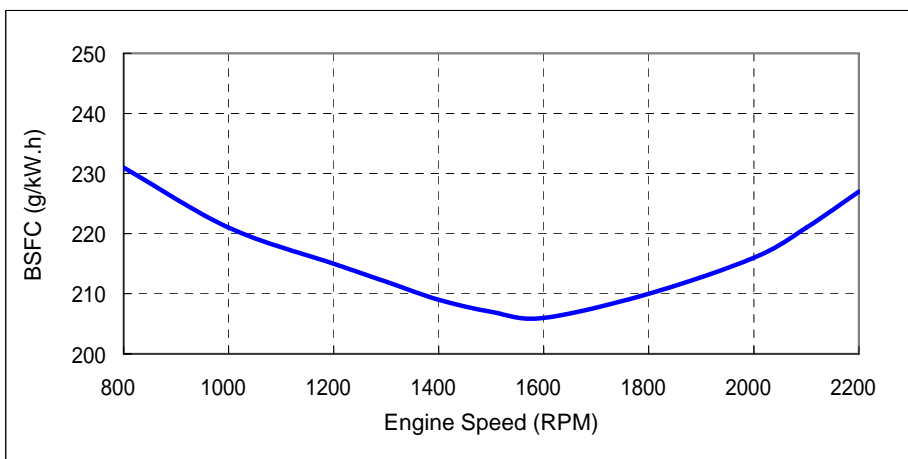
TORQUE

RPM	N.m
800	400
1000	598
1200	738
1300	750
1400	738
1500	728
1600	709
1800	660
2000	628
2100	606
2200	575



POWER OUTPUT

RPM	kW
800	34
1000	63
1200	93
1300	102
1400	108
1500	114
1600	119
1800	125
2000	131
2100	133
2200	132



FUEL CONSUMPTION

RPM	g/kW.h
800	231
1000	221
1200	215
1300	212
1400	209
1500	207
1600	206
1800	210
2000	216
2100	221
2200	227

All performance data based on the standard status and GB/T18297 conditions.



Base Engine Data Sheet

Pg. No.

02

ENGINE MODEL:	6BTA5.9-C180	CPL NUMBER :	8541	DATE: 15JUL06
CONFIGURATION NUMBER :	D403039CX02	CURVE NUMBER :	FR91536	
AFTERCOOLED SYSTEM :	Jacket Water	RATED POWER :	180 bhp @ 2200rpm	
FUEL SYSTEM :	Inline - WEIFU PW/RSV		132 kW @ 2200rpm	

GENERAL ENGINE DATA

Engine Wet Weight (Pricing Configuration).....	-kg	443
Moment of Inertia of Rotating Components (No Flywheel).....	-kg·m ²	0.25
Center of Gravity from Front Face of Block.....	-mm	391
Center of Gravity above Crankshaft Centerline.....	-mm	140
Crankshaft Thrust Bearing Load Limit		
—Maximum Intermittent.....	-N	3425
—Maximum Continuous.....	-N	1112

ENGINE MOUNTING

Maximum (Static) Bending Moment at Front Support Mounting Surface.....	-N.m	435
Maximum (Static) Bending Moment at Side Pad Mounting Surface.....	-N.m	TBD
Maximum (Static) Bending Moment at Rear Face of Block.....	-N.m	1356
Moment of Inertia of Complete Engine		
— Roll Axis.....	-kg·m ²	16.5
— Pitch Axis.....	-kg·m ²	41.1
— Yaw Axis.....	-kg·m ²	35.4

EXHAUST SYSTEM

Maximum Back Pressure.....	-mmHg	76
Exhaust Pipe Size Normally Acceptable.....	-mm	75
Maximum Static Supported Weight at the Turbocharger Outlet Flange.....	-N.m	13.5
Exhaust Manifold Insulation Acceptable.....	-Yes/No	No
Turbocharger Insulation Acceptable.....	-Yes/No	No

AIR INTAKE SYSTEM

Maximum Intake Air Restriction with Heavy Duty Air Cleaner		
— Clean Element.....	-mmH ₂ O	381
— Dirty Element.....	-mmH ₂ O	635
Minimum Dirt Holding Capacity with Heavy Duty Air Cleaner.....	-g/litre/sec.	53
Maximum Temperature Rise from Ambient to the Inlet of the Turbocharger.....	-	17
Maximum Pressure Drop from the Turbocharger Outlet to the Intake Manifold.....	-kPa	TBD

LUBRICATION SYSTEM

Normal Operating Oil Pressure Range.....	-kPa	69 - 345
Maximum Lube Oil Flow for Engine Accessories.....	-litre/min.	4.0
Maximum Sump Oil Temperature.....	-	127
Minimum Engine Oil Pressure for Engine Protection Devices:		
— At Rated Speed and Load.....	-kPa	276
— At Torque Peak Speed and Load.....	-kPa	207
— At Low Idle.....	-kPa	69
Minimum Required Lube System Capacity - Sump plus Filters.....	-litre	16.3
By-pass Filtration Required.....	-Yes/No	No
Angularity of Standard Oil Pan: (Values stated are for intermittent operation only):		
— Front Down.....	- °	45
— Front Up.....	- °	45
— Side to Side.....	- °	45

**COOLING SYSTEM**

Coolant Capacity - Engine Only.....	-litre	10.4
Maximum Engine Cooling Circuit External Resistance.....	-kPa	34
Minimum Pump Inlet Pressure with Open Thermostat and no Pressure Cap.....	-mmHg	TBD
Maximum Static Head of Coolant Above Engine Crankshaft Centerline.....	-m	TBD
Standard (modulating) Thermostat Range.....	-	82-93
Maximum Block Coolant Pressure with Closed Thermostat and no Pressure Cap.....	-kPa	276
Minimum Pressure Cap.....	-kPa	50
Maximum Engine Coolant Temperature at Engine Outlet.....	-	100
Maximum Engine Coolant Temperature for Engine Protection Devices.....	-	101.6
Minimum Engine Coolant Temperature.....	-	71
Minimum Fill Rate.....	-litre/min.	19
Maximum Initial Fill Time.....	-min.	5
Minimum Coolant Expansion Space.....	- %of System Capacity	6
Maximum Deaeration Time.....	-min.	25
Minimum Drawdown.....	— % of Total System Capacity	11%
(Drawdown Must Exceed the Volume Not Filled at Initial Fill & Must Not Include Expansion Space)		
Fan-on Engine Coolant Outlet Temperature.....	-	93
Shutter Opening Coolant Outlet Temperature.....	-	85
Shutter Opening Intake Manifold Air Temperature.....	-	N/A

CRANKING SYSTEM

Minimum Battery Capacity - Cold Soak at 0°F (–18°C) or Above	12V	24V
— Engine Only - Cold Cranking Amperes.....	-CCA	950 475
— Engine Only - Reserve Capacity.....	-min.	260 130
Maximum Starting Circuit Voltage Drop @ ----Amperes.....	-Volts	TBD
Minimum Ambient Temperature for Unaided Cold Start.....	- (-°F)	-12
Minimum Cranking Speed Required for Unaided Cold Start.....	-rpm	125
Breakaway Torque at Minimum Unaided Start Temperature.....	-N.m(lb.-ft.)	TBD
Cranking Torque at Minimum Unaided Start Temperature.....	-N.m(lb.-ft.)	TBD
Cranking Torque at -10°F.....	-N.m(lb.-ft.)	TBD

FUEL SYSTEM

Maximum Fuel Flow on the Supply Side of the Fuel Pump.....	-kg/hr	193
Maximum Fuel Inlet Restriction		
— with clean fuel filter.....	-mmHg	102
— with dirty fuel filter.....	-mmHg	203
Maximum Fuel Drain Restriction		
— with check valves.....	-mmHg	TBD
— less check valves.....	-mmHg	510
Maximum Fuel Inlet Temperature.....	-	71
Minimum Fuel Tank Air Venting Capability Required at 6 in. H ₂ O Back Pressure.....	-litre/hr	340



Low Idle Set Speed.....	-rpm	800
Maximum Governed Speed (10% of Rated Torque)	-rpm	2450
Maximum Overspeed Capability.....	-rpm	3750
Maximum altitude limit restriction		
—Continuous.....	-m	3000
Closed Throttle Torque @ 700 rpm (for 900 rpm Low Idle Speed).....	-N.m	TBD
Throttle Angle		
—High Idle.....	Deg.	103 ± 5
—Low Idle.....	Deg.	70± 5
—Delta.....	Deg.	33
Throttle Angle at Engine Shutdown		
—Engine Work.....	Deg.	105 ± 5
—Engine Shutdown.....	Deg.	46 ± 5

EMISSIONS:

Estimated Free Field Sound Pressure Level At 15 m (50 ft.) and Full-Load Governed Speed
(Excludes Noise from Intake, Exhaust, Cooling System and Driven Components)

—Right Side.....	-dBa	TBD
—Left Side.....	-dBa	TBD
—Front.....	-dBa	TBD
—Rear.....	-dBa	TBD

Gaseous Emissions per ISO 8178:

—Weight-Specific NOx.....	g/kW.h	7.69
—Weight-Specific HC.....	g/kW.h	0.42
—Weight-Specific CO.....	g/kW.h	0.43
—Weight-Specific Particulates.....	g/kW.h	0.168

Fuel Rating Option used for these Data: **FR91536**

Engine Speed.....	-rpm
Gross Power Output.....	-kW
Torque.....	-N.m
Intake Manifold Pressure.....	-kPa
Motoring Friction Horsepower.....	-kW
Turbocharger Compressor Outlet Pressure.....	-kPa
Intake Air Flow.....	-litre/sec.
Exhaust Gas Flow.....	-litre/sec.
Exhaust Gas Temperature - Dry Stack.....	-
Heat Rejection to Ambient (Dry Manifold).....	-kW
Heat Rejection to Coolant (Dry Manifold).....	-kW
Heat Rejection to Fuel.....	-kW
Engine Coolant Flow.....	-litre/sec.
External Cooling Circuit Resistance.....	- Kpa P
Altitude Limitations:	
—Intermittent.....	-m
—Continuous.....	-m
Steady State Smoke.....	-Bosch

RATED POWER	MAXIMUM POWER POINT	PEAK TORQUE
2200		1300
132		102
575		750
115		105
15		9
125		110
210		133
440		285
500		530
TBD		TBD
72		55
0.5		0.3
2.6		2.0
20.7		20.7
3500		3500
3000		3000
1		1.5

ALL DATA CERTIFIED WITHIN 5%

TBD = To Be Decided

N/A = Not Applicable

N.A. = Not Available

All data is subject to change without notice, sorry for inform.